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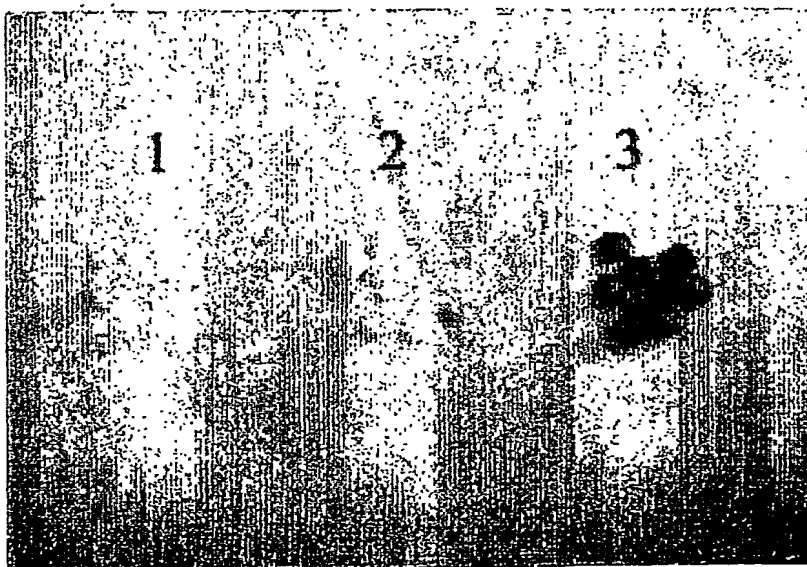
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[Continued on next page]

(54) Title: POLYMER-SUPPORTED METAL NANOPARTICLES AND METHOD FOR THEIR MANUFACTURE AND USE



(57) Abstract: A method for making polymer-supported metal nanoparticles (3) is disclosed comprising providing a polymer support material (1), contacting the support with a metal nanoparticle or metal nanoparticle precursor (2), and contacting the support material and metal or metal precursor with a fluid that swells the support material sufficiently to allow the metal or precursor to diffuse into the support material. The method also may comprise reducing the metal of the metal precursor to provide a metal nanoparticle. Typically, the support material is a plastic. The metal can be various metals including palladium, rhodium, platinum, iridium, osmium, gold, nickel, iron or combinations thereof. The nanoparticles can comprise alloys or aggregates of two or more metals. The fluid can be

any fluid that facilitates polymer swelling, one example being supercritical carbon dioxide. A method for performing chemical reactions comprises providing a polymer-supported metal nanoparticle and selected reagents under conditions allowing chemical reactions to occur. The method may involve reducing or oxidizing sites of unsaturation or functional groups. Relative amounts of the reduction products can be varied by selecting an appropriate metal nanoparticle, polymer support material, or both.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/40826

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B22F 9/18
US CL : 75/351, 362, 369

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 75/351, 362, 369

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST--search terms = nanoparticle (and variations), polymer near support or substrate, unsaturated near organic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- A	US 2003/0139594 A1 (CAPAN et al.) 24 July 2003 (24.07.2003), see entire document.	1-7, 10-13, 21-32, 36-42, 45, 47, 48, 61, 66-68, 77, 78, 82-84 8, 9, 14-20, 33-35, 43, 44, 46, 49-60, 62-65, 69-76, 79-81

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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